

Science File

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while it leaves others completely intact.'*

Valerie Stone, University of Denver neuroscientist

An Innate Ability to Smell Scams

Brain: Two studies suggest that humans have developed a special mechanism to detect cheaters over the millennia.

By EMILY SINGER
TIMES STAFF WRITER

You've probably received e-mail messages just like this one: A stranger has lots of money in a Nigerian bank account and you can have half of it—if you just provide your account information to help make the bank transfer.

Most people who have encountered the Nigerian bank scam are automatically skeptical of such a request—and there could be a good reason that goes far beyond common sense.

Two studies, published in the current issue of the journal *Proceedings of the National Academy of Sciences*, show that human brains may be wired with a special mechanism to detect cheating. While the exact mechanisms are still hazy, researchers found that a patient with damage to parts of his frontal lobe and amygdala (sometimes known as the fear center of the brain) was unable to see through such scams.

In the other study, scientists found that the ability to detect cheaters exists across very different cultures—a group of Harvard University undergraduates and a tribe of Amazonian hunter-agriculturalists.

A Key to Cooperation

Leda Cosmides, an evolutionary psychologist at UC Santa Barbara, said humans may have evolved the strategy to detect cheaters as a necessary component of cooperation.

In order for cooperation to evolve as a beneficial tactic, people needed to be able to weed out those who aren't willing to pay for the benefits they receive. People who always cooperate, without getting favors in return, would be open to exploitation, Cosmides said. Over the course of evolution, they are likely to be selected out of the population, she said.

Lance Rips, a professor of psychology at the University of Chicago, said the findings could have another explanation. The ability to detect cheaters may be related to more general logic mechanisms rather than an innate cheater detector, he said.

But Cosmides said the ability to detect cheating appears to be distinct from general logical

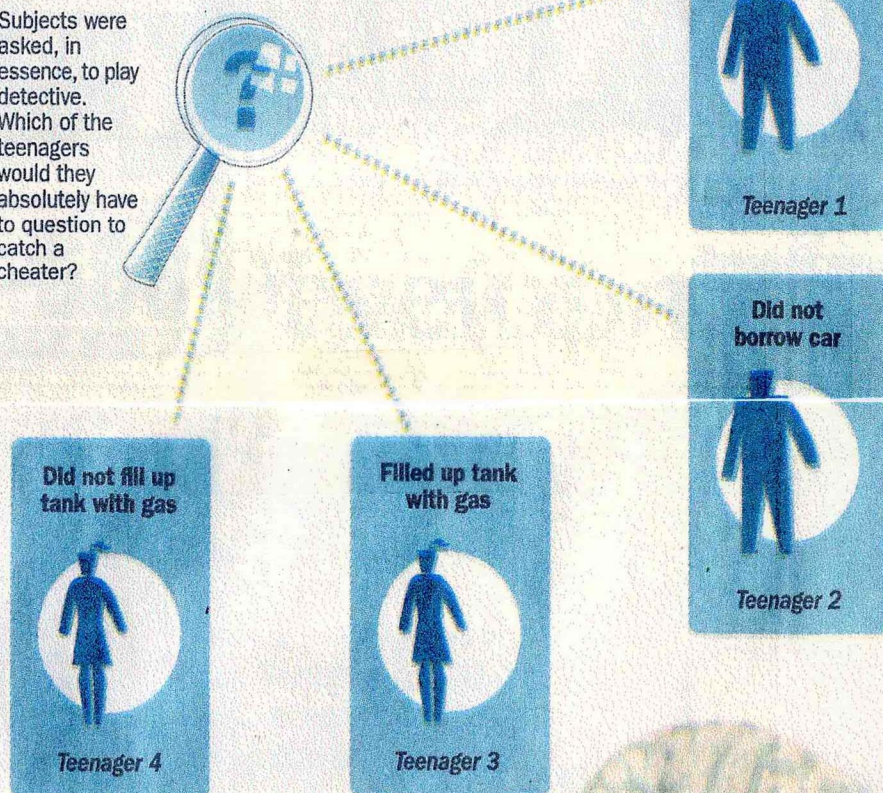
Cheating Detection

Researchers presented subjects with a variety of logical puzzles to test their ability to catch cheaters. Here's one example:

"In return for the privilege of borrowing the car, the Goldsteins have given their kids the rule: If you borrow my car, then you have to fill up the tank with gas."

- 1 Subjects are presented four cards representing the Goldsteins' children. Each card shows some information about what the children did.

- 2 Subjects were asked, in essence, to play detective. Which of the teenagers would they absolutely have to question to catch a cheater?



- 3 Most people can figure out that the only possible suspects are the teenagers who "borrowed car" and "did not fill up the tank with gas."

One subject who had damage to his orbitofrontal lobe and amygdala had difficulty picking the proper suspects in this type of logical puzzle. These brain areas are involved in planning and emotion.

Source: UC Santa Barbara

processes. The findings of the studies suggest that the mechanisms used for this type of social exchange are specialized, much like the programs on a computer, Cosmides said.

"You would use [Microsoft] Word for writing articles and [Microsoft] Excel for crunching numbers because they are specialized for these types of problems," Cosmides said.

Cosmides likened the cheater detection ability to language, which is learned across cultures and without going to school. People develop cheater detection instinctively, in the same way they develop language.

A 'Reasoning Instinct'

Cosmides called this type of ability a "reasoning instinct." While most people traditionally

think of reason and instinct as diametrically opposed, there are logical mechanisms that can develop without being taught, she said. "They have the characteristics of an instinct, but the program produces a form of reasoning."

Researchers have found a brain-damaged patient who may help them to understand just how this reasoning instinct

works. The patient, who is referred to as R.M., suffered brain damage in a bike accident.

R.M. had most cognitive functions intact and seemed to function normally. But he had difficulty understanding what people were thinking and feeling: He couldn't understand their intentions, said Valerie Stone, an evolutionary neuroscientist at the University of Denver, who led the study.

R.M. had problems detecting dishonesty in people and was often exploited. Eventually, his family had to take over his finances.

Stone presented R.M. with two types of statements, each following the same type of logical rule. One described a detail of the physical world—"If you work in the lab with viruses, you must wear gloves." The other described a type of social contract—"If I give you a watch, then you give me \$100." R.M. was then given different scenarios and asked to determine which ones followed the rule.

Both problems make the same types of demands on memory, language and logical processing, Stone said. But while R.M. could easily do the problems about the physical world, he could not figure out the ones involving social contracts. The results show that there is a difference in how the brain thinks about people and how it thinks about the physical world, she said.

"When a part of the brain is injured, it can knock out certain aspects of mental function while it leaves others completely intact," Stone said. "You can then develop a picture of which mental abilities are independent."

In a second study, Cosmides and colleagues took the cheater detection idea one step further. They hypothesized that if this type of "mental program" is required for the evolution of cooperation, the program should exist across cultures.

Researchers tested cheater detection ability in the Shiwiari, a relatively isolated tribe in the Amazon. "The Shiwiari are a nonliterate society ... and are living a life much more similar to our hunter-gatherer ancestors," Cosmides said.

Researchers found that the Shiwiari had the same cheater detection capabilities as a group of highly educated Harvard undergraduates.

Cosmides and Stone said the findings may help people with brain damage or disorders who have difficulty with social interactions and judgments. Doctors may be able to make a more precise diagnosis and to help them better adapt to social situations.

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